The Reorganization of a Department of the Government

By HON. GEORGE von. L. MEYER
Secretary of the Navy

ORGANIZATION OF THE NAVY DEPARTMENT

The present organization in Washington, which was put into force in the Navy Department in December, 1909, had for its main object the establishment of a system which would enable the Secretary to administer his office efficiently and economically, with the advice of responsible expert advisers, insuring continuity of policy for the future. For this reason the Department was divided into four logical divisions, and for the head of each division an officer was selected who was specially qualified for the duties assigned to him. These divisions, as stated, were four in number, and may be summarized in this way: The Division of Material furnishes the completed ship and supplies her with stores, ready for the personnel. The Division of Personnel then furnishes the officers and men necessary to man the ship. The Division of Operations uses the product thus furnished to perform the duties assigned to the fleet. The Division of Inspections examines the results attained in the various fields of naval activity and reports directly to the Secretary.

With the assistance of the Aids of these divisions, acting as the eyes and ears of the Secretary, the work accomplished has resulted in economy and efficiency. Economy is shown by the fact that the effective material strength of the navy has been increased without exceeding the current appropriations. Efficiency is shown by the facility with which the business of the Department has been transacted.

The navy yard is a military establishment existing solely for military purposes. A part of the work—the largest part, if magnitude be gauged by the amount of money expended—is industrial in its character, but not in its object.

But yards cannot be scientifically managed to the greatest advan-

Read at the first meeting of the Efficiency Society, held in New York City, March 18 and 19, 1912.

tage so long as the Secretary is hampered by lack of power to use the moneys appropriated to the best advantage. The yards must be organized and managed so as to promote military efficiency, and it is necessary that the yards produce results which will increase the military value of the fleet, for the fleet is the Navy.

The problem which will have to be met when the canal is completed and the fleet is spending six months of the year on the Pacific Ocean is the question of the consolidation of the navy yards. We are at present embarrassed by a superfluous number of navy yards, distributed along the Atlantic coast from Maine to Louisiana. This calls for a vast amount of money to be expended for maintenance, absolutely unnecessary to meet the actual requirements of the fleet. But nothing can be accomplished in the abolition of needless navy yards until public sentiment is aroused to the necessity of it, and until it becomes so evident that local interests will be overcome by public interest in meeting this question on broad, patriotic, business principles.

Business principles have been applied to the navy, both ashore and afloat, in so far as possible. Radical changes have been made where the efficiency of the yards and ships would allow, and a progressive policy of improvement has been consistently followed throughout this administration.

STORES

Consolidation of stores, simplification of accounts, separation of the accounting from the shops and its consolidation under one officer, increased accuracy in the reports of the cost of work, all these have had a part in the production of a more economical and a more efficient administration in the navy yards.

The same principles have been carried to the ships at sea where all stores are under the care of one officer, the general storekeeper of the ship. The different departments have been given a money allotment for stores, the amount of which is less than the value of the old allowance of stores in kind.

This consolidation of all supplies and the consequent economy in storeroom space, maintaining one stock of supplies under the custody of one officer, *in lieu of five stocks* under as many officers; the charging to the appropriation concerned, with only such quantities of supplies as are actually used for the maintenance of each department, and at the time such supplies are drawn for use; the separation of the stock of supplies and the accounting for same, from those actually

being consumed; the consolidation and simplification of accounts, and the relieving of line officers of a great volume of clerical work which properly formed no part of their technical line duties; all these are changes which have been wrought for economy and efficiency on shipboard, and which indicate our policy toward a progressive administration, the ultimate aim of which is a high standard of production for an economical outlay of capital.

GUNNERY

The principles of scientific management have been known and practiced in the fleet for years. Recently it has been the cause of the wonderful increase in the gunnery efficiency of the navy.

In the battle practices of recent years the competitive system has given remarkable results. Officers drill and train their crews; every man is carefully selected according to his physical and mental qualifications to do the duties at the gun; some are selected as gun pointers, some as sight setters, and others as loaders and plug-men. Each individual is tried repeatedly to see if he is best suited to the job at hand. The result is that every man at a gun station is the man best suited in every way, physically and temperamentally, for his particular duty.

The study of the time element of certain operations has been going on for years, and a marked decrease in the amount of time necessary to perform these operations has resulted.

The first step was to make more rapid the work of each individual, making his movements as simple and easy as possible, and making them harmonious, so that there would be no interference. In order to obtain these ends, each individual was first made to go through his work slowly, so that accuracy and perfection of each operation were obtained and unnecessary movements eliminated. This plan not only insured perfection of detail, but unconsciously to himself each man was training his muscles so that they would quickly respond to his call and so that he would suffer the minimum of fatigue. As perfection of detail increased, speed was sought for, and each man's work was carefully timed by stop watch.

Having trained the muscles and developed the skill of the individual, it became necessary to coördinate the work of the organization as a whole. Exactly the same methods were employed as for the training of the individuals; *i. e.*, each part of the organization slowly

and precisely did the part of the work assigned it, and precision and ease of operation were attained.

Every detail was timed by stop watch; for instance, it required two and one-fifth seconds to open the breech of a 12-inch gun; one-fifth of a second to put in primer; three and two-fifths seconds to ram the projectile; four and one-fifth seconds to ram the powder; three-fifths of a second to withdraw the loading tray, etc.

It is recognized that no man can work continuously during a long period, especially when under great mental stress, but that each man must have certain periods of rest in order to allow nature to build up what has been torn down. In order to reduce the mental stress to a minimum, drills are held frequently, so that although each man must at all times be alert, the method of the performance of the work becomes an ingrained habit, to a certain degree a second nature with the man, and no conscious effort of the mind is required to perform each operation. The functions of the different members of a turret crew are laid out so that even with the greatest possible rapidity of fire each man must rest during a given part of the operation of loading and firing a gun. For example, the trainer and pointer may rest their eyes while the gun is being loaded, the plugman has no duty to perform while the pointer and trainer are getting on the target before firing, and while the projectile and powder are being loaded into the gun, etc.

Having attained a high standard of speed in accurate firing of one gun the drills are extended to the whole broadside of ten or twelve turret guns.

The object sought is well indicated by the opening statement in the "Rules for Battle Practice, 1911," that "the measure of the battle efficiency of any vessel is her ability to deliver the greatest number of hits in the shortest possible time after the enemy is sighted, and with the least expenditure of ammunition."

The value of these methods is obvious. Not only do they serve to attain economically scientific performance of all work done, but, knowing the plans and details of any new vessel, they serve as a very exact guide to the number of men necessary to man and fight her efficiently.

As a result of practical management, the hitting power of the fleet at long ranges has improved remarkably.

Conditions have varied from year to year, due to weather experienced at different practices, changes in target area, and changes in methods used. Within the last two or three years, the target has

been very much reduced in area, but even with this handicap, in the spring battle practice of 1911 the 12-inch guns doubled the scores made at the practices only six months previous.

With the improvement in gunnery has also come a marked improvement in preparedness for battle. The rules have been so drawn as to direct thought toward what may be expected in an engagement. Casualties have been simulated and unexpected difficulties have been thrown in the way by the officers controlling the fire, so that they may be able to meet all obstacles.

The methods for making the "approach" when about to engage in battle have been studied and developed as a result of the various battle plans laid down by the department for the actual firing of the guns.

None of our vessels are now "smooth-water" ships. The department has demanded that the training should be conducted on the open sea, where the rolling and pitching require the most expert skill on the part of the gunpointers in order to hit the target. Further, it has been assumed that the ships may have to fight in the most unfavorable weather, and, therefore, the rules for the battle practices have required the ships to train for fighting in rain, snow, and foggy weather, and generally when conditions are most unfavorable and adverse. For these reasons, the officers and crews are prepared to meet whatever may come up, and the ability to handle successfully the casualties that will probably be met in action is one of the most important parts of the training.

In the competitive battle firing, the conditions are made just as severe as those that would obtain in actual action. The firing vessel has no knowledge of the course, speed, and distance of the target vessel. All the information she has is that somewhere on the horizon, at a distance of 10 miles or more, is a column of smoke which marks the target vessel at which she is to shoot. She steams toward it at her best speed and opens fire at whatever range she chooses; but the value of hitting at long ranges is vitally impressed on her by the amount that is added to or subtracted from her score for the shots that hit beyond 12,000 yards or under that mark.

The whole firing is over in four minutes and the ship has no other chance to make good, if she fails in this. No excuses are accepted for failure of guns to fire, for breakdowns of any character, or for any faults of the personnel or material.

As evidence of the value of competition in gunnery, a comparison is made with the fighting efficiency of the vessels during the Spanish-

American war and at the present writing. The percentage of hits in 1898 was 3½ with the large guns firing about once in five minutes at short range. The percentage of hits in the recent firing at the San Marcos was 33 1-3, the range being 10,000 yards and the present rate of firing a single 12-inch gun being about ten shots in five minutes. This rather overestimates the work at Santiago and underestimates the work to-day. A roughly drawn comparison shows that we are about 1,200 times better in gunnery efficiency than we were at Santiago.

The policy now for the competitive training for battle is that it shall begin on the date of commission, and no excuses are accepted for being unprepared should the department at any time require the ships to fire at a day's notice.

ENGINEERING

All ships in the fleet are now placed on a competitive basis in engineering. This has resulted in such improved efficiency and economy that the Atlantic fleet, for instance, now burns less coal per knot in steaming at 12 knots than it did at 10 knots' speed during the much discussed trip around the world. Ships now in almost all cases continue to exceed on full power trials their trial trip speed, and with greater economy in coal and oil.

These results were produced by the most energetic attention to duty, in which losses and wastes were eradicated in boilers, engines, and auxiliaries, as indeed they must be if a ship is to take a creditable stand in the engineering competition. A constant stream of detailed information on design and operation exists between ships and the department and between department and ships, so that officers may readily benefit by the experience of others; that good organization and sound practices may become standardized, and that methods of doubtful expediency may be brought under widespread discussion.

That such interest in engineering matters would result in a general desire on the part of officers for more complete engineering education was easily foreseen. The establishment of the School of Marine Engineering at Annapolis, as a post-graduate course, in collaboration with the Engineering Experiment Station at that place, opened up this avenue, and met with instant recognition from the service. This school, only three years old, has already proved its value, and its bearing on engineering efficiency is assured. Aside from its educa-

tional value, the Engineering Experiment Station, also at Annapolis, has resulted in large economies.

Nor is the practical engineering education of the enlisted force forgotten, there being schools for machinists and coppersmiths at Charleston, S. C., and at San Francisco, an oil-fuel burning test plant and school at Philadelphia, and an electrical and a radio-telegraph school at New York.

Repair initiative, resulting in a vessel's self-sustaining qualification, has received great impetus during the last few years. Ships will never be entirely self-sustaining, this being limited both by necessary lack of large repair facilities and by the short periods of time possible to allow for repairs and alterations. Large savings in time and money in repair work are now the order of the day, and ships undertake their own repairs as a matter of pride and as a matter of course. The well-known resourcefulness of the American mechanic is a large element in this.

The United States Navy has every reason to be encouraged by its engineering prospects, and to feel assured that it is on the right track to efficiency. The duties and responsibilities of line and engineer officers, brought about by the amalgamation enactment in 1899, which caused such wide comment and doubt in the naval world, at home and abroad, are accepted in our navy with enthusiasm. Already its results are said to be 25 per cent. better, measured in fuel economy, than those of one of the large navies; and in our own Navy conditions have greatly improved, and, furthermore, are constantly improving. That we are not distinctly in first place in advancement is probably traceable at present to our present national tendency to be behind in experimental and research work, in which the Germans notably lead; but that this feature is receiving attention by the whole country is well known, and great improvements along this line may be confidently expected.

MODERN MANAGEMENT AND EFFICIENCY

So-called scientific management is an evolution and not an invention. The pressure of competition and the growth of large corporations has forced a scientific examination of all business methods, and naturally we have certain acknowledged experts in modern management who are fully acquainted with the theory, and some of the practice, of methods necessary to produce both economy and efficiency in many branches of modern business.

There are two portions of the theory that are essentially new:

the formation of a thinking or planning branch in the administrative body, one that advises and does not execute; and second, the direct instruction of the workman through each motion that makes up his daily work.

The formation of a staff that advises but does not execute was first worked out in the armies of the world, and the German general staff is an example of it in the highest state of efficiency. The failures of this principle can generally be traced to attempts to combine staff and executive functions.

I have endeavored to create such a branch in the navy department at Washington by taking four experienced officers as aids to advise me in questions of administration of the fleet, of the personnel, of the material, and of inspection, the four natural divisions of the military work of the department.

The aids plan and advise me, and the approved plans are executed by the commanders of the fleet and the chiefs of the several bureaus.

The second portion of modern scientific management is the instruction of the men so as to save unnecessary work and promote efficiency after a careful consideration of the operations performed by the mechanic rather than leaving each mechanic to use his special tools as developed by his own skill from inherited knowledge. This, with the bonus system for good work, I found had already been adopted in the fleet. The planning board was represented by the director of target practice and engineering competitions, and the men were carefully selected in accordance with the requirements of their work, and all unnecessary motions were eliminated. The work in turrets and in engine and fire rooms was scientifically studied, and increased efficiency resulted.

A board of scientific management experts, on visiting the fleet, stated that the battleships were the finest examples of scientific efficiency that they had ever seen.

The adoption of like plans in the navy yards presents many difficulties. The nature of the work there is largely repair work and the time of completion may be at times more important than the cost of the work. I have given and am giving the problem much consideration, and the yards will eventually be brought to as high a state of efficiency as is consistent with military necessities.

To further this, I visited England, primarily for the purpose of examining into the systems of organization and methods employed in the English dockyards and in the leading shipbuilding establishments of Great Britain.

I found at the works of Messrs. Vickers, Limited, at Barrow-in-Furness, a most efficient and simple system of management, containing a hull division and a machinery division.

The greatest percentage of increased efficiency seemed to have been attained by broad effects in systematization and in securing the cheerful coöperation of workmen toward best results, through proper recognition of their initiative and more efficient effort. In order to obtain still greater coördination, I have appointed a director of navy yards to advise me on all such questions.

The present practice of giving seagoing officers experience at navy yards and in shops aids materially in keeping the vessels of the fleet ready for action, for this experience enables them to make repairs to machinery, etc., with the ship's force, and thus keep ships away from the yards, except for the larger repairs. This principle of giving officers shop experience in navy yards on the machinery they care for and keep in repair at sea is of great importance, because in time of actual war ships must be kept on the battle line and kept in working order by their own officers and men. No battleship can then be spared from the fleet.

"Economy" is a much-abused word; it is often used as a synonym for "parsimony"; light expenditures are frequently called "economical expenditures." No idea could be further from the truth. True economy is almost synonymous with efficiency.

The closer competition of modern business forces scientific management on all who would not be left behind in the race. The employers must submit to greater overhead charges for the sake of increased economy in other directions, and they must deal fairly with their men in the matter of a bonus for extra work accomplished; and the employees must agree to give up their claim that all of a like rate in the same trade must receive equal compensation.

In conclusion, I desire to quote from a preliminary report of the Committee on Labor of the House of Representatives, made June 24, 1911, which says, in part:

"If energy is wasted in any form in our industries or in any of the departments of the Government, the elimination of the conditions producing the waste would be beneficial alike to employer and employee, to the Government and to the people. Their elimination would have the same effect as the introduction of a labor-saving device. No protest has been received from any source against the elimination of wasted energy."